

NEW EXPANDED TOBACCO PROGRAM

1991 OPERATIONAL PLANS

2021530035

OBJECTIVE

The objectives of the New Expanded Tobacco program are to: 1) develop an expanded tobacco material having more "tobacco-like" subjectives, 2) reduce degradation to allow for improved product quality and better yield, and 3) reduce CO₂ emissions as compared to DIET.

STRATEGIES

- I. Define process modifications that will improve product thermal treatment uniformity and reduce degradation which can be included in the planned DIET installations.
- II. Develop a batch gas impregnation process which will result in improved product subjectives and physical characteristics relative to the present DIET process.
- III. Develop a continuous gas impregnation process which will result in improved product subjectives and physical characteristics relative to the present DIET process.
- IV. Develop new expansion and reordering schemes which will produce expanded tobacco with improved subjectives, better process control, and greater processing design flexibility.
- V. Define a process to chemically stiffen expanded tobacco which will reduce thermal treatment and the associated subjective degradation while maintaining cigarette filling power equivalent to the current process.
- VI. Evaluate the feasibility of converting existing DIET plants to the NET processes.
- VII. Develop and evaluate processing alternatives to the DIET process to produce partially expanded tobacco for inclusion in cigarette blends, which will reduce cigarette density to 0.18 g/cc while maintaining acceptable physical and subjective characteristics.

I.Strategy

Define process modifications that will improve product thermal treatment uniformity and reduce degradation which can be included in planned DIET installations.

<u>Tactics:</u>	<u>Completion Date</u>
A. Assure plug flow, short residence time at the tower infeed.	12/91
B. Provide uniform gas-tobacco distribution in the tower.	12/91
C. Eliminate separator recycle and provide plug flow discharge.	12/91

II. Strategy

Develop a batch gas impregnation process which will result in improved product subjectives and physical characteristics relative to the present DIET process.

Tactics:

Completion Date

- | | | |
|----|---|----------|
| A. | Support commercial design of the current batch gaseous CO ₂ impregnation process. | on-going |
| B. | Define process parameters for a higher pressure batch gaseous CO ₂ impregnation process. | 7/91 |

III. Strategy

Develop a continuous gas impregnation process which will result in improved product subjectives and physical characteristics relative to the present DIET process.

<u>Tactics:</u>	<u>Completion Date</u>
A. Design and develop a continuous impregnation pilot process utilizing proven equipment and technology.	12/91
B. Design and develop a continuous impregnation process utilizing a linear-pocket process concept.	12/91
C. Design and develop a high pressure rotary valve for feeding and discharging tobacco from an impregnator.	12/91

IV. Strategy

Develop new expansion and reordering schemes which will produce expanded tobacco with improved subjectives, better process control, and greater processing design flexibility.

<u>Tactics:</u>	<u>Completion Date</u>
A. Design and develop a system which decouples the puffing, drying, and setting steps associated with tobacco expansion.	12/91
B. Evaluate humid air and conveyor reordering systems compared to cylinder reordering and specify a reordering process to minimize breakage and maximize CV.	9/91
C. Implement the defined processing steps/parameters into the NET pilot system for evaluation.	10/91
D. Optimize and evaluate the processing schemes for production of expanded tobacco having the desired product quality and subjectives.	12/91

V.Strategy:

Define a process to chemically stiffen expanded tobacco which will reduce thermal treatment and the associated subjective degradation while maintaining cigarette filling power equivalent to the current process.

Tactics:

Completion Date

- | | | |
|----|---|---------|
| A. | Identify the critical chemical parameters which determine the amount of stiffening. | Ongoing |
| B. | Evaluate the effect of processing steps on acetic acid content of expanded tobacco stiffened with calcium acetate. | 10/91 |
| C. | Identify and evaluate alternative additive systems which may provide a subjective advantage. | 11/91 |
| D. | Define the relationships between add on level, bulk time, filling power, and subjective results for the stiffening additives. | 11/91 |
| E. | Determine the application method for adding the stiffening agent to expanded tobacco feedstock. | 12/91 |
| F. | Conduct product tests to evaluate the physical and subjective qualities of chemically stiffened expanded tobacco. | 12/91 |
| G. | Determine the repeatability of the selected process. | 12/91 |
| H. | Investigate the aging characteristics of chemically stiffened product. | 12/91 |

VI. Strategy:

Evaluate the feasibility of converting existing DIET plants to NET processes.

<u>Tactics:</u>	<u>Completion Date</u>
A. Develop a batch gaseous CO ₂ impregnation process that is compatible with existing DIET equipment.	1/93
B. Define the modifications required to retrofit existing DIET plants with gaseous CO ₂ impregnation.	4/93
C. Identify NET processing schemes that are feasible for inclusion in existing DIET plants.	6/93
D. Define the DIET plant revisions and pilot the system for process and product evaluations.	8/93

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VII. Strategy:

Develop a process to produce partially expanded tobacco for inclusion in cigarette blends, which will reduce cigarette density to 0.18 g/cc while maintaining acceptable physical and subjective characteristics.

<u>Tactics</u>	<u>Completion Date</u>
A. Identify and test potential processing schemes.	6/92
B. Construct a pilot development facility.	9/92
C. Determine the relationship between processing conditions and subjective/physical properties for each tobacco type (bright, burley oriental).	12/92
D. Compare the effect of blend expansion in various combinations with the expansion of individual blend components on subjective/physical properties.	3/93
E. Determine the contribution of DIET and ES components to subjective/physical properties both as standard expanded products and as included in partial expansion.	6/93
F. Analyze blend similarities and production requirements for all brands.	9/93
G. Select processing scheme and conduct detailed physical, chemical, subjective, and economic evaluations.	12/93

NEW EXPANDED TOBACCO PROGRAM
ESTIMATED RESOURCE REQUIREMENTS

I. ALLOCATED PERSONNEL*

	<u>CURRENT</u>	<u>12-31-91</u>
Analytical Research	3.00	3.00
Computer Applications	0.20	0.20
Cigarette Development	0.30	0.50
Cigarette Testing	3.50	3.50
Development Engineering	3.50	3.50
Flavor Development	0.85	0.60
Product Evaluation	0.30	0.30
Physical Research	8.00	8.00
Tobacco Fundamentals	11.70	8.20
Tobacco Materials	7.00	4.00
Tobacco Processing	<u>2.00</u>	<u>2.00</u>
TOTALS	37.35	30.80

*Does not include Executive and Administrative Services.

II. OUTSIDE EXPERTISE

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| A. | Dr. F. A. Zenz | Consulting on fluid-particle processing technology and the design of tobacco processing systems. |
| B. | Pemm-Corp. | Plexiglas modeling of tobacco handling systems. |
| C. | Creare, Inc. | Computer modeling expertise to support the development of tobacco processing systems. |
| D. | M. W. Kellogg | Engineering and design of various NET pilot processes. |
| E. | Securamax | Design and fabrication of a unique high pressure (1,000 psig) rotary valve for use in a continuous gas impregnation process. |
| F. | Foster Miller In | Design of a continuous gas phase impregnation system utilizing a linear-pocket conveyor. |

TECHNOLOGY TRANSFER

TECHNOLOGY:

New Expanded Tobacco Process

DESCRIPTION:

The transfer of technology for the NET process includes processing and equipment specifications for tobacco impregnation with gaseous CO₂, expansion, gas/tobacco separation and reordering. This technology will be transferred to PM-USA Engineering as it is developed. A joint effort between R&D and Engineering is currently underway with commercialization of the batch gaseous CO₂ impregnation process.

TRANSFER DATE:

On-going.